Household Life Cycle and Length of Stay in Housing Assistance Programs

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Abstract

In 1998, public housing agencies (PHAs) were given considerable discretion to select tenants on the basis of local PHA preferences rather than on old federal preferences for households experiencing housing-related hardships. Many PHAs have adopted other categorical preferences. As a result, the demographic profile and household composition of public housing tenants have changed. These changes have important implications for the U.S. Department of Housing and Urban Development's Housing Choice Voucher Program (HCVP), because past research has found that household characteristics and location factors significantly affect a household's length of stay in the program. The study described in this article uses administrative data to explore the factors associated with a household's length of stay in the HCVP. The study focuses on the degree to which the presence of children of varying ages affects a household's length of stay in the program and the degree to which older children, as a potential source of childcare, may mitigate a longer duration of housing assistance. The study also explores the degree to which the disability status of the household head or children affects a household's length of stay in the program. The study's main finding is that the presence of an infant or a toddler increases a household's length of stay in the HCVP, after controlling for an array of household and location characteristics, but the presence of other children in the same household attenuates this effect. Conversely, the study finds that the presence of teenagers, especially male teenagers, magnifies this effect.

Introduction

The U.S. Department of Housing and Urban Development's (HUD's) Housing Choice Voucher Program (HCVP)—formerly called the Section 8 Rental Certificate Program—was created in 1974; since then, it has become a primary federal vehicle for providing housing assistance to low-income households. In 2005, the program served more than 1.9 million households.[1] For many years, the program was targeted to households that were experiencing various housing-related hardships, such as being involuntary displaced, living in substandard housing, being homeless, and paying more than 50 percent of household income for rent. Public housing agencies (PHAs) across the country were charged with administering the program and were required by law to allocate 90 percent of their vouchers (and certificates) to households that were confronting housing-related hardships (Devine et al., 2000).

In 1998, federal preferences for households with housing-related hardships were repealed under the Quality Housing and Work Responsibility Act (QHWRA), and PHAs were given considerable discretion in selecting tenants on the basis of local PHA preferences. For example, PHAs may select people from their waiting lists who are enrolled in training programs or who are already working, although PHAs that adopt a preference for working tenants must also give an equal preference to heads of households who are elderly and people with disabilities. PHAs are simultaneously expected to allocate 75 percent of their vouchers to households with adjusted incomes that do not exceed 30 percent of the area median income (AMI). Research conducted in 2000 suggests that very few PHAs nationally (12 percent) base their program preferences exclusively on the old federal preferences, and most PHAs have adopted other categorical preferences (Devine et al., 2000). These preference decisions, in turn, have altered the composition of households served by the HCVP nationwide.

Changes in household composition have important implications for the HCVP. Recent research using administrative data on HCVP participants suggests that household and location characteristics affect a household's length of stay in the program (Ambrose, 2005; Freeman, 2005; Olsen, Davis, and Carrillo, 2005). Some household characteristics (for example, being elderly or disabled) are associated with longer lengths of stay in the program and others (for example, higher income and younger age groups) are associated with shorter lengths of stay. This evidence suggests that PHAs that alter their tenant compositions on purpose may unknowingly be affecting the amount of time that households use the voucher and, thus, potentially limiting the number of vouchers available to serve households on the PHAs' waiting lists. Conversely, changing tenant composition may lead to quicker exits from the program, which, in turn, would free up vouchers for other needy households. Therefore, to understand how vouchers are used nationwide, we must first understand which household characteristics affect HCVP attrition rates.

The study described in this article analyzes administrative data from HUD to explore household characteristics that are associated with a household's length of stay in the HCVP. Although a number of such characteristics have been analyzed previously, this article focuses on the degree to which the presence of children of varying ages is related to a household's length of stay in the

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[1] The total includes 11,221 certificates and 1,922,654 vouchers.

program and the degree to which older children, as a potential source of childcare, may mitigate a longer duration of assistance for households with infants and toddlers. The study also explores the degree to which the disability status of the household head or children affects a household's length of stay in the program. Previous research has found disability status to be strongly associated with attrition rates in housing assistance programs. To understand better the unique constraints for households with a disabled head of household or child with disabilities, we compare characteristics associated with length of stay in the program across three types of heads of households: nonelderly heads of households with a child or children; nonelderly, disabled heads of households with a child or children; and nonelderly heads of households with at least one disabled child.

Literature Review: A Brief Summary

An emerging body of literature explores the length of time that a household receives housing assistance and the factors that influence the length of time. Research suggests that attrition rates in assisted housing are associated with multiple factors, including tenants' socioeconomic characteristics, changes in household composition, housing market conditions and the availability of affordable housing options, and the year of entry into assisted housing. Particular attention has been given to characteristics that describe the life cycle of a program participant, such as year of entry and age composition, and several metropolitanwide economic factors, such as wages, demand for labor, and rent structures.

Using the Longitudinal Occupancy, Demography, and Income file,[2] Olsen, Davis, and Carrillo (2005) conclude that elderly status and disability status of the head of household are by far the two largest influences on a household's decision to leave the HCVP. Heads of households who have disabilities are about 37 percent less likely to exit the tenant-based HCVP, and heads of households who are elderly are about 23 percent less likely to exit compared with otherwise similar households. Other household characteristics, such as race and size of the household, played a much smaller role in explaining differences in attrition rates. The study also found that a $100-per-month lower local payment standard was associated with a 3-percent higher rate of program exit and a $100-per-month higher minimum tenant contribution to rent was associated with a 13-percent higher program attrition rate.

Ambrose (2005) used a random sample of households from HUD's Multifamily Tenant Characteristics System (MTCS) and Tenant Rental Assistance Certification System (TRACS) and found that individual characteristics are very important to understanding a program participant's exit from the tenant-based HCVP, a public housing program, or a project-based housing program. Elderly heads of households are 48, 56, and 59 percent, respectively, less likely to exit from these programs; disabled heads of households are 54, 76, and 57 percent, respectively, less likely to exit. Gender, race, income, housing composition, housing location, and city size were also found to be statistically significant factors in determining the likelihood of a participant's leaving assisted housing. The effects of local economic conditions on program exits varied by program type.

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[2] The file contains data from HUD's Multifamily Tenant Characteristics System and Tenant Rental Assistance Certification System for 1995 through 2002.

Freeman (2005) used data from the New York City Housing and Vacancy Survey to explore whether household composition is related to the receipt of housing assistance. Freeman found that the likelihood of exiting housing assistance is highest in the earliest years of a housing assistance stay and that the most significant predictors of ending a housing assistance stay were residing in public housing; being White, young, and nondisabled; and having no children. The vacancy rate of the local housing market was also a predicator. The study also suggested that recipients of housing assistance were less likely to be married and less likely to get married over time, but little evidence was found that housing assistance contributed to the dissolution of partnerships. In addition, recipients of housing assistance have more children, but, after they receive housing assistance, they are less likely to have additional children.

Bahchieva and Hosier (2001) used administrative data from the New York City Housing Authority to explore lengths of stay in public housing. The authors found that lengths of stay were influenced by demographic characteristics, income level and sources, and housing characteristics. The highest exit rates were among participants with incomes exceeding 80 percent of AMI, single people, young or very old heads of households, White heads of households, and non-Hispanic immigrants. The authors also found that tenants in smaller apartments and higher crime neighborhoods had higher exit rates, and previously homeless people had the highest probability of exiting during the early years of tenure. Most striking, the median length of stay derived from a survival analysis is more than 42 years, and more than one-quarter of the lengths of stay are more than 55 years. These very long lengths of stay likely are associated with the very tight housing market in New York City, which greatly restricts mobility options among low-income households.

Before these recent studies, most research relied on surveys that asked program participants to self-report their housing assistance status, although evidence suggests that such self-reporting may be unreliable (Shroder, 2002). Freeman (1998) used data from the Panel Study of Income Dynamics to examine the dynamics of residents in public housing and found that demographic, location, and cultural factors—including where residents grew up, the educational attainment of heads of households, and whether a child grew up in a household with both parents—influence lengths of stay, or durations, in public housing. Freeman concludes that quicker exits from public housing are associated with various factors: growing up in a two-parent family; being non-Hispanic; having more than a primary school education (1–8 years of school); having additional work experience; being divorced; residing in an area with a higher vacancy rate and more affordable housing units; and living in the Northeast or Midwest. In addition, Freeman did not find evidence supporting the notion that participants who use housing assistance for longer periods of time are less likely to exit, sometimes referred to as the "duration dependence phenomenon." The duration dependence phenomenon suggests that program participants become accustomed to living with housing assistance and making ends meet and, thus, are less likely to exit the program (Bane and Ellwood, 1994).

Susin (1999) used data from the Survey of Income and Program Participation to examine the effect of employment, earnings, and household composition on the length of housing subsidy. The study's main finding is that employment and earnings are modestly associated with an exit from subsidized housing, and up to 56 percent of exits are associated with household composition changes (for example, the birth of a child or a marriage). Susin also found that other household characteristics—such as having a high school degree, higher earnings and income, and welfare

receipt—and location factors, such as a local area's median rent and the state vacancy rate—were important predictors of exiting from subsidized housing.

Conceptual Framework for Understanding the Effect of Children on a Household's Length of Stay in the HCVP

Past research underscores the important relationship between households' life cycles and length of stay in assisted housing, but little is known about the independent effect of children on the length of stay. On initial reflection, the relationship between the presence of children and length of stay in the program is not obvious.

Associations between the presence of children and the length of time households receive housing assistance seem especially likely when households include either infants or toddlers together with teenagers. The presence of infants or toddlers may lead some households to remain in the housing program if the heads of households cannot find adequate daycare and, consequently, are unable to obtain gainful employment to pay rent in the private market. Among participants in the HCVP, lack of good-quality childcare has been found to be one of the most important barriers to finding employment and, thus, becoming self-sufficient (Reed, Pashup, and Snell, 2005; Turnham et al., 2006).

The presence of teenagers ages 13–17 may influence the exit of households from housing assistance in different ways, albeit very limited evidence exists describing this potential association. On one hand, the presence of teenagers may increase the likelihood of exits from the HCVP. Research on welfare recipients suggests that program-induced increases in maternal employment, especially in low-wage labor markets, may lead some teenagers to assume more household and adult-like responsibilities, such as caring for younger children in the household, housecleaning, shopping, cooking, or employment (Burton, 1997). Female teenagers are particularly more likely to assume household duties (Dodson and Dickert, 2004). Although this research focuses on the effect of maternal employment on teenagers, it also raises the possibility of an inverse dynamic: heads of households may be more likely to become employed if a teenager is available to help care for younger children in the household. Expressed differently, the presence of teenagers—especially female teenagers—may help a household become self-sufficient if the head of the household can leave the children with the teenager and find gainful employment, rather than stay home to care for the children.

On the other hand, teenagers often present more challenges to households. Households that have teenagers who are getting into trouble in school or in the neighborhood may be prompted to move to another community to change the teenager's environment. Some of these moves may be portability moves (that is, the household continues to receive housing assistance in another PHA's jurisdiction) and other moves may involve exits from the program altogether if the household has sufficient resources. In some cases, households may have greater incentives to become self-sufficient and exit housing assistance if they believe they can improve their teenagers' environment and, in turn, their outcomes as adults. Previous research that focused on recipients of Temporary Assistance for Needy Families who also received tenant-based rental assistance suggests that recipients' decisions to move are influenced greatly by their desire to improve their children's well-being (Turnham et al., 2006).

Alternatively, some households with at-risk teenagers may feel overwhelmed by the stresses brought on by teenagers and decide to focus on stabilizing their family life before considering other important choices (for example, seeking employment, asking for a raise, or uprooting the family and moving elsewhere). As Turnham et al. (2006) suggest, families in the HCVP are confronted by an array of stressful circumstances at home and in their neighborhoods—paying rent and utilities, coping with the absence of a male partner/spouse, avoiding drug and criminal activity in the neighborhood, providing for their children—and many families triage their living situation by focusing on one issue at a time. Families may choose to focus on the well-being of their teenagers before considering other issues that, in turn, could affect their self-sufficiency outcomes and ability to exit the HCVP.

Some households with teenagers may be less willing to exit housing assistance if they prefer to keep teenagers rooted in their social settings, especially the teenagers' school and friends, and the housing assistance enables them to stay where they are. Studies that have explored household outcomes following moves to different communities—aided by housing assistance—demonstrate that some households continue to send their teenage children back to the schools located in previous neighborhoods (Orr et al., 2003). If housing assistance is helping a household maintain a teenager's routine, the housing assistance may be providing a disincentive for households to become self-sufficient and exit housing assistance.

The potential effects of young children (ages 6–12) on the length of time a household stays in the program are less understood or studied. Young children may delay a household's exit from housing assistance for some of the same reasons associated with infants and toddlers. On the other hand, children approaching their teens may be asked by the head of household to babysit younger children in the household while the head of household is working or taking other steps to become self-sufficient (for example, enrolling in a job training program, going to a job interview, or completing a certificate or degree program).

The Data

This analysis uses data from three data sources: (1) administrative data collected in HUD's MTCS/ Public and Indian Housing Information Center (PIC) system between 1997 and 2005, (2) the 2000 Decennial Census, and (3) the Low-Income Housing Tax Credit database.

The MTCS/PIC database from 1997 to 2005 contains nearly 14 million records—3.3 million certificate records and 10.5 million voucher records. The total number of records increases steadily from about 1.1 million in 1997 (about 807,000 certificates and 274,000 vouchers) to 1.9 million in 2005 (approximately 11,000 certificates and 1.88 million vouchers). The universe of records for the analysis consists of households in the MTCS/PIC data file that began receiving assistance in 1997 or later. Some of those households may have experienced housing assistance before 1997, but at some point they exited the program and then reentered between 1997 and 2005. We addressed three key data issues to construct the MTCS/PIC analysis file: (1) truncated records, (2) discontinuities in the longitudinal data file, and (3) unrecorded or unknown exits from the program.[3] After we addressed these issues and identified new program entrants between 1997 and 2004,

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[3] Further information on how these issues were addressed is available from the authors.

we selected three types of heads of households: (1) nonelderly heads of households with a child or children; (2) nonelderly, disabled heads of households with a child or children; and (3) nonelderly heads of households with at least one disabled child.[4] In this study, we used all records associated with these head-of-household types.

Exhibit 1 shows the total number of records in the analysis file by head-of-household type and year of entry. Overall, the final analysis file contains nearly 760,000 records. The overwhelming majority of households (84 percent) are nonelderly heads of households with a child or children; some of the records (13 percent) are nonelderly, disabled heads of households with a child or children; and a few (3 percent) are nonelderly heads of households with at least one disabled child.

We used census data in the analysis to control for location factors that may influence households' lengths of stay in the HCVP. The census data provide indicators of level of urbanization (central city, suburb, and nonmetropolitan), census division of the United States, metropolitan civilian unemployment rate, and metropolitan statistical area/primary metropolitan statistical area (MSA/ PMSA) housing vacancy rate. We also use census data to determine whether the PHA has a high mean rent in the metropolitan area. We sorted data from Census 2000 Summary File 3 by census tract and merged the information to the MTCS/PIC data file using the 2000 Census tract identifier.

Under a separate HUD contract, Abt Associates assembled a database with low-income housing tax credit (LIHTC) units placed in service between 1995 and 2004. The database includes information on a multitude of variables, including project location, number of total units, and number of tax credit units. Census tract identifiers also are attached to each record. We merged the LIHTC database to the MTCS/PIC data file to identify and control for the availability of LIHTC units in the same census tract as the household receiving housing assistance.

Exhibit 1

Number of Households in the HCVP Analysis File by Head-of-Household Type, 1997–2004

Year	Nonelderly Heads of Households With a Child or Children	Nonelderly, Disabled Heads of Households With a Child or Children	Nonelderly Heads of Households With at Least One Disabled Child	Total Household Records
1997	75,415	11,966	2,933	90,314
1998	72,460	11,353	2,772	86,585
1999	70,495	12,034	2,831	85,360
2000	70,516	11,119	2,976	84,611
2001	105,921	15,395	4,504	125,820
2002	92,271	13,292	3,717	109,280
2003	87,389	12,237	3,470	103,096
2004	63,305	8,510	2,676	74,491
Total	637,772	95,906	25,879	759,557

HCVP = Housing Choice Voucher Program.

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[4] We constructed variables to identify each head-of-household type.

Using these data sources, we constructed several key variables needed to (1) address central study questions about the effects of children's age composition and of household members' disability status on HCVP length of stay; and (2) represent a series of covariates that we used to control for rival explanations (but which are also of interest in their own right). The covariates used included the age of the householder, availability of units funded by the Low-Income Housing Tax Credit program, race and ethnicity, income and sources of income, and other key household and location characteristics.[5] (The full list of covariates appears in exhibits 2, 3, and 4.)

The variables associated with the effect of children on program lengths of stay are particularly noteworthy. To measure the effects of children on a household's length of stay in the program, we constructed the following variables: the total number of children in the household (a continuous variable) and a series of dummy variables indicating whether the household included the presence of children in a series of specific age-gender categories.

To test hypotheses about caring for younger children in the household, we created a series of variables representing the interaction of dummy variables indicating the presence of infants (ages 0–3) and toddlers (ages 4–5) and variables indicating the presence of older boys and girls, both young children and teenagers. For variables on older boys and girls, we included dummy variables distinguishing male young children ages 6–12, female young children ages 6–12, male teenagers ages 13–17, and female teenagers ages 13–17.

The interaction terms allow us to explore the significance of spacing between children of different ages and to test if varying age groups are associated statistically with exits from the HCVP. The interaction terms also describe how the presence of young children and teenagers influences the potential effects of infants and toddlers on exits. For example, the hypothesis regarding caring for younger children in the household would be supported by a finding that households with infants stay on assistance longer than those without infants, but this effect is smaller when the household also includes the presence of a teenager. The next section describes our multivariate analysis strategy in detail.

The Methodology

We use a piecewise-exponential duration model to explore the relationship between household compositions—specifically, the presence of children of different ages—and length of stay, or duration, in the HCVP.[6] The model assumes that the exact timing of an event (that is, a household's exit from the HCVP) is known. The exact timing of the event is indicated by the "effective date of action" variable in the MTCS/PIC database. This model accounts for right-censoring and accommodates time-varying covariates.

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[5] We also attempted to control for local rent structures by including two variables: the household's income in proportion to area median income and gross rent in proportion to Fair Market Rent. These variables were highly correlated with a metropolitan area's vacancy rate in the regression equation, which is problematic because parameters in duration models are estimated by an iterative numerical method called "maximum likelihood." When variables that are highly correlated are included in a model, the likelihood function does not converge and coefficient estimates cannot be produced.

[6] We used SAS software, as described in Allison (1995).

We used two regression models in the study. The first model contains the dummy variables that indicate whether a child of a particular age group is present, plus an array of household and location characteristics. The model does not include the child-interaction variables. The full model adds the child interaction variables to the first model. Both models are estimated separately for each type of head of household (that is, nonelderly heads of households with a child or children; nonelderly, disabled heads of households with a child or children; and nonelderly heads of households with at least one disabled child) and for the total universe of households.

Formally, the model is written:

$$\log[h_i(t)] = X_{i1}\beta_1 + X_{i2}\beta_2 + X_{i3}\beta_3 + X_{i4}\beta_4 + X_{i5}\beta_5 \qquad\qquad (\text{equation 1})$$

where

$h_i(t)$ represents the duration of household i in the program at time period t;

X_{i1} represents 0-1 dummy variables indicating various entry years (cohorts);

X_{i2} is a set of variables accounting for the number and spacing of children of different ages in the household;

X_{i3} is a vector of household demographic variables;

X_{i4} includes the set of geographic covariates;

X_{i5} is a series of period-specific intercepts for the households; and

β_1, β_2, β_3, β_4, and β_5 are vectors of regression coefficients.

To interpret the magnitude of the regression coefficients, we transformed (or exponentiated) the parameter estimates reported by SAS software into a survival time ratio (Hosmer and Lemeshow, 1999). For a dummy (0/1) explanatory variable, the time ratio (that is, e^β) provides the estimated ratio of the expected survival time of the two groups, where the reference group is the group coded as 0 in the dummy variable. For instance, assume that the estimated coefficient for the dummy variable for wage income is negative 0.363. The time ratio, $e^{-0.363}$, is equal to 0.70 and suggests that a working household's length of stay in the program is 70 percent of the length of stay among households that are not in the labor force, after controlling for other covariates. For a continuous variable, the formula $100(e^\beta-1)$ yields the percentage increase in the expected survival time for a one-unit increase in the explanatory variable.

Parameter estimates associated with the child-related variables suggest whether and how HCVP exit probabilities are affected by the presence of children in a household. To test hypotheses about the effects of combinations of infants, toddlers, and older children, we add a series of multiplicative terms to a base model including only dummy variables for each main age group.

To control for other household characteristics and local labor and housing market conditions, the model includes numerous covariates (see exhibits 2, 3, and 4). Most of the covariates are measured as of the year of the tenant's program entry. Our variables capturing numbers of children in different age groups are time-varying, however, to reflect changes in age groups resulting from new arrivals in the household (for example, births) and departures (for example, young adults leaving home).

Including other covariates (apart from the number and age of children) helps to control for other factors that influence probabilities of exit from the HCVP, which could affect estimates of child-age effects.

In addition, the model includes a set of geographic variables to account for location effects. The number of LIHTC units in the census tract controls for the availability of alternative affordable rental units in the neighborhood. The unemployment and housing vacancy rate measures control for the greater likelihood that households in worse labor markets and households in tighter rental markets are more likely to remain in the HCVP. The dummy variables for central city, suburb, and rural location, plus the census division variables, control for fixed effects in these geographic locations.

Results

Exhibits 2, 3, and 4 provide descriptive profiles of the three types of heads of households in the study: nonelderly heads of households with a child or children; nonelderly, disabled heads of households with a child or children; and nonelderly heads of households with at least one disabled child. Exhibit 2 lists household characteristic variables, exhibit 3 lists the child-related variables, and exhibit 4 lists the location variables that are included in the analysis.

Household Characteristics

Exhibit 2 lists household characteristics for all households in the analysis file and for each head-of-household type. Overall, the three head-of-household types share many of the following characteristics:

- Small (averaging slightly more than three people in the household).
- Young (average age of household head is 31).
- Headed by a minority (60 percent of household heads are African American or Hispanic).
- Headed by a single person (91 percent of households do not have a spouse present).
- Poor (average annual income is $10,100, which is about 20 percent of the AMI).

We note a few key differences across the head-of-household types. Nonelderly heads of households with a child or children have significantly higher wage incomes compared with other head-of-household types. Nonelderly heads of households with a child or children earn about $6,300 annually, which is about five times greater than the wage income of nonelderly, disabled heads of households with a child or children ($1,209) and almost twice the amount of nonelderly heads of households with at least one disabled child ($3,585).

Also, nonelderly, disabled heads of households with a child or children are older than their counterparts. These head-of-household types are about 38 years old, and nearly two-thirds of these heads of households are adults ages 35 or older. By comparison, nonelderly heads of households with a child or children and nonelderly heads of households with at least one disabled child typically are adults 30 and 32 years old, respectively, and less than one-third of these heads of households are adults 35 years or older.

Exhibit 2

Descriptive Statistics for Households in the HCVP, Household Characteristic Variables

Variable	Household Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child		Test of Difference in Means Across Groups
		Mean	Stdev	Mean	Stdev	Mean	Stdev	Mean	Stdev	
AgeHH	Age of household head	30.90	8.78	29.82	8.11	37.93	9.97	31.66	7.80	***
						(percent)				
FamSize	Total number of people in the household	3.26	1.25	3.25	1.23	3.21	1.27	3.74	1.43	***
Adult1824	Presence in household of adults ages 18–24	34	48	37	48	20	40	25	44	***
Adult2534	Presence in household of adults ages 25–34	43	49	44	50	34	47	51	50	***
Adult35p	Presence in household of adults ages 35 or older	33	47	28	45	64	48	33	47	***
White	Head of household is non-Hispanic White	37	48	36	48	44	50	28	45	***
Black	Head of household is non-Hispanic African American	45	50	45	50	40	49	55	50	***
Hispanic	Head of household is Hispanic	15	36	15	36	12	33	15	35	***
Other	Head of household is other race	3	18	3	18	4	20	3	16	***
Female	Head of household is female	91	29	92	27	82	38	94	24	***
nMarried	No spouse is present in household	90	29	91	28	85	36	93	25	***
Homeless	Head of household was previously homeless	3	18	3	18	3	18	4	19	
						(US$)				
Income	Total household annual income	10,093	6,308	10,011	6,469	10,339	5,067	11,135	6,449	***
Asset	Total household asset amount	47	886	44	790	70	1,392	46	684	
Wage	Total household wage income	5,553	7,355	6,290	7,550	1,209	3,883	3,585	6,328	***
						(number)				
adjAMI	Household income in proportion to AMI	20	12	20	12	21	10	22	12	***
adjRent	Gross rent in proportion to FMR	101	137	101	103	100	20	119	526	***
Number of households		759,557		637,772		95,906		25,879		

AMI = area median income. FMR = Fair Market Rent. HCVP = Housing Choice Voucher Program. Stdev = standard deviation.

Notes: *** significance at the 1-percent level; ** significance at the 5-percent level; * significance at the 10-percent level.

The nonelderly heads of households with at least one disabled child are often African American (55 percent), which is about 10 and 15 percentage points greater than the proportion associated with nonelderly heads of households with a child or children and nonelderly, disabled heads of households with a child or children, respectively. In addition, these head-of-household types are paying about 20 percent more than Fair Market Rent (FMR).[7] Nonelderly heads of households with a child or children and nonelderly, disabled heads of households with a child or children typically are paying FMRs.

Child-Related Characteristics

Exhibit 3 shows the descriptive statistics for the child-related variables, and the variable means across household groups are statistically significant (.01) for nearly every variable.[8] As discussed earlier in this article, the child-related characteristics are as follows: "infant" refers to a child ages 0–3, "toddler" refers to a child ages 4–5, "young child" refers to a child ages 6–12, and "teenager" refers to a child ages 13–17.

Overall, each household has about two children. Of the households in the study, 50 percent have one or more infants (ages 0–3), 50 percent have one or more young children (ages 6–12), 25 percent have toddlers (ages 4–5), and 25 percent have teenagers (ages 13–17). Also, about 10 percent of households have an infant and a male teenager, and an additional 10 percent have an infant and a female teenager.

Nonelderly heads of households with at least one disabled child differ from the other head-of-household types in several important ways. These heads of households are much more likely to have young children (67 percent) than are nonelderly heads of households with a child or children (50 percent) and nonelderly, disabled heads of households with a child or children (53 percent). Moreover, these head-of-household types are consistently more likely to have different child-group pairings, particularly pairings that include young children. For example, about 16 percent of nonelderly heads of households with at least one disabled child have an infant and a young male child and 15 percent of these households have an infant and a young female child, 5 to 10 percentage points above the corresponding rates in other head-of-household types.

Geographic Characteristics

Exhibit 4 provides the descriptive statistics for the geographic variables. Although statistically significant at the .01 or .05 level for most of these variables, the differences in means across head-of-household types are very small. Overall, households in the study are residing in areas

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[7] Housing assistance payments distributed by HUD are limited by Fair Market Rents (FMRs) that are established by HUD. In the Housing Choice Voucher Program, the FMR is the basis for determining the "payment standard amount" used to calculate the maximum monthly subsidy for an assisted family. For more information, see HUD's Proposed Fair Market Rents for Fiscal Year 2008 for the Housing Choice Voucher Program and Moderate Rehabilitation Single Room Occupancy Program; Notice (Docket No. FR–5152–N–01), available at http://www.huduser.org/datasets/fmr/fmr2008p/fy2008p_preamble_complete.pdf.

[8] Because households can have multiple children in different age categories, the variables indicating the presence of children in different age groups, such as Kids03, Kids45, Kids612, and Kids1317, are not mutually exclusive. Expressed differently, the households can be observed in multiple child-age groupings.

Exhibit 3

Descriptive Statistics for Households in the HCVP, Child-Related Variables

Variable	Child-Related Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child		Test of Difference in Means Across Groups
		Mean	Stdev	Mean	Stdev	Mean	Stdev	Mean	Stdev	
nKids	Number of children in household	2.04	1.13	2.05	1.12	1.87	1.10	2.56	1.32	***
						(number)				
Kids03[a]	Presence in household of infants ages 0–3	50	50	54	50	31	46	47	50	***
Kids45[a]	Presence in household of toddlers ages 4–5	26	44	27	45	18	39	32	47	***
Kids612[a]	Presence in household of young children ages 6–12	51	50	50	50	53	50	67	47	***
Kids1317[a]	Presence in household of teenagers ages 13–17	44	44	23	42	41	49	30	46	***
Kids03*Kids612m	Presence in household of infants ages 0–3 and male young children ages 6–12	10	30	10	30	6	25	16	37	***
Kids03*Kids612f	Presence in household of infants ages 0–3 and female young children ages 6–12	10	30	10	30	7	25	15	36	***
Kids03*Kids1317m	Presence in household of infants ages 0–3 and male teenagers ages 13–17	2	14	2	14	2	15	4	19	***
Kids03*Kids1317f	Presence in household of infants ages 0–3 and female teenagers ages 13–17	3	17	3	17	3	17	5	22	***
Kids45*Kids612m	Presence in household of toddlers ages 4–5 and male young children ages 6–12	8	27	8	2	6	23	13	34	***
Kids45*Kids612f	Presence in household of toddlers ages 4–5 and female young children ages 6–12	8	27	8	27	6	24	12	32	***
Kids45*Kids1317m	Presence in household of toddlers ages 4–5 and male teenagers ages 13–17	2	13	2	12	2	13	3	17	***
Kids45*Kids1317f	Presence in household of toddlers ages 4–5 and female teenagers ages 13–17	2	13	2	13	2	12	2	16	*
						(number)				
Number of households		759,557		637,772		95,906		25,879		

(percent)

HCVP = Housing Choice Voucher Program. Stdev = standard deviation.

[a] These age categories are not mutually exclusive—households may appear in one or more categories—and thus the percentages may not total 100 percent.

Notes: *** significance at the 1-percent level; ** significance at the 5-percent level; * significance at the 10-percent level.

Exhibit 4

Descriptive Statistics for Households in the HCVP, Location Variables, 2000

Variable	Location Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child		Test of Difference in Means Across Groups
		Mean	Stdev	Mean	Stdev	Mean	Stdev	Mean	Stdev	
Vacancy	Metropolitan area rental vacancy rate, 2000	9	6	9	6	9	6	9	7	*
					(percent)					
Lihtc	Number of LIHTC units in census tract, 2000	119	139	120	137	113	142	125	165	
					(number)					
					(percent)					
Unemp	Metropolitan area unemployment rate	6	2	6	2	6	2	6	2	***
OwnOcc	Metropolitan area owner-occupancy rate	53	21	53	21	54	21	51	22	***
City	Household located in central city	49	50	49	50	49	50	53	50	**
Suburb	Household located in suburban area	30	46	30	46	30	46	31	46	
Rural	Household located in rural or nonmetropolitan area	21	41	21	41	22	41	16	37	***
PovRate	Metropolitan area poverty rate	20	12	20	12	20	12	22	13	***
NEglnd	In the New England census division	6	23	6	23	7	25	5	22	**
MAtlntc	In the Middle Atlantic census division	12	33	12	33	12	33	14	35	
ENCetrl	In the East North Central census division	15	36	15	35	17	37	16	37	***
WNCetrl	In the West North Central census division	9	28	9	29	7	25	6	23	***
SAtlntc	In the South Atlantic census division	16	37	16	37	16	37	18	38	
ESCetrl	In the East South Central census division	7	26	7	26	8	27	8	27	**
WSCetrl	In the West South Central census division	15	36	15	36	12	33	15	36	***
Mtn	In the Mountain census division	6	23	5	23	6	25	4	20	***
Pac	In the Pacific census division	14	35	14	35	15	36	14	34	***
					(number)					
Number of households		759,557		637,772		95,906		25,879		

HCVP = Housing Choice Voucher Program. LIHTC = low-income housing tax credit. Stdev = standard deviation.

*Notes: *** significance at the 1-percent level; ** significance at the 5-percent level; * significance at the 10-percent level.*

with similar characteristics: moderate-poverty neighborhoods (20-percent poverty rate) that are typically located in central cities (49 percent) and have a fair number of LIHTC units (119 units). These neighborhoods are in metropolitan areas with 9-percent vacancy rates, 6-percent unemployment rates, and 53-percent owner-occupied units, on average. Households are geographically distributed, much like the national population, with larger concentrations of households in the South and West.

Descriptive Analysis by Exit Status

Exhibit A-1 in appendix A presents the household, child-related, and geographic characteristics separately for households that exited the HCVP and for households that never exited (that is, stayers) during the study period (1997 to 2004). Nearly all of the characteristics associated with exiters and stayers are statistically different at the .01 level, and a few merit particular attention.

- **Race.** Exiters are substantially more likely to be non-Hispanic Whites compared with stayers. About 47 percent of exiters are non-Hispanic Whites, and 28 percent of stayers are non-Hispanic Whites. In particular, African Americans constitute a large proportion of stayers (53 percent) but a much smaller proportion of exiters (37 percent).

- **Gender.** Although most households in the study are headed by females, stayers have more female heads of household than exiters have. About 88 percent of exiters are households headed by females, compared with 93 percent of stayers.

- **Income.** Both exiters and stayers are highly disadvantaged economically. Interestingly, exiters have slightly lower total income and wage income compared with stayers. The average annual income among exiters is about $10,050, and more than half of that amount ($5,573) is from wage income. In contrast, the average annual income among stayers is about $10,789, and about $6,121 is associated with wage income.

- **Number of Children.** Exiters have slightly fewer children than stayers. Exiters average fewer than two children per household, whereas stayers have more than two children per household.

- **Age of Children.** Exiters are more likely to have teenagers than are stayers, and stayers are more likely to have infants, toddlers, and young children. Stayers are also slightly more likely to have different types of child pairings. For example, 2 percent of stayers have both toddlers and teenagers together in the household compared with 1 percent of exiters.

- **Vacancy Rates.** Exiters are more likely to reside in metropolitan areas with larger vacancy rates than are stayers. The vacancy rate among households that exited the HCVP is about 9.2 percent compared with 8.6 percent among stayers.

- **Central City Location.** Exiters are less likely to live in central cities (43 percent) compared with stayers (56 percent).

- **Poverty Rate.** Although both exiters and stayers live in poor neighborhoods, exiters lived in neighborhoods with poverty rates that are about 2 percentage points lower than those of stayers. The neighborhood poverty rate among exiters is 19 percent compared with 21 percent among stayers.

Duration of Assistance and Exit Rates by Head-of-Household Type

Exhibit 5 presents the length of program stays (in years) by head-of-household type, and exhibit 6 provides survival curves for each head-of-household type. To account for censoring of the data that occurs when household records are observed for differing amounts of time, we use the Kaplan-Meier product-limit method to estimate lengths of stay and graph the survival curves (Kaplan and Meier, 1958). For example, a household that entered in 1997 can be observed for up to 8 years, but a household that entered in 2003 is observed for only 2 years.

The median length of stay for all households in the HCVP is nearly 3 years, with substantially longer stays for households with at least one disabled child than for other households. The median length of stay among nonelderly heads of households with a child or children is about 2.8 years, which is nearly two-thirds of the median (4.4 years) associated with nonelderly heads of households with at least one disabled child.

Exhibit 6 graphically displays survival curves for each head-of-household type. Each line represents the fraction of households that had not yet exited from the HCVP at successive lengths of stay after the point of original entry. The statistic (log-rank test) that tests for equality of survival functions indicates that the survival curves associated with the three head-of-household types are significantly different (.01 level). The log-rank test statistic compares the observed number of exits from the HCVP with the number expected in each head-of-household type under the null hypothesis of no survival difference among the three head-of-household types.

Both nonelderly heads of households with a child or children and nonelderly, disabled heads of households with a child or children experience a substantial fall in program participation after the first year in the HCVP. Fewer than 90 percent of those households remain in the program for 1 year. By the second year since program entry, only about 60 percent of those head-of-household types remain in the program. For both of those head-of-household types, the proportion remaining in the program steadily decreases over time, and the rate of decrease is slightly larger for nonelderly heads of households with a child or children. Fewer than 20 percent of those head-of-household types remain in the HCVP by the ninth year since program entry.

In contrast, the slope of the curve associated with nonelderly heads of households with at least one disabled child is less steep, particularly between the first and third years since program entry.

Exhibit 5

Length of Program Stay (in Years) in the HCVP by Head-of-Household Type, 1997–2004 Entering Cohorts

Percentile	All Households	Nonelderly Heads of Households With a Child or Children	Nonelderly, Disabled Heads of Households With a Child or Children	Nonelderly Heads of Households With at Least One Disabled Child
25th	1.45	1.44	1.47	1.87
50th	2.89	2.83	3.00	4.40
75th	6.58	6.44	6.84	8.59

HCVP = Housing Choice Voucher Program.

Exhibit 6

Survival Function by Head-of-Household Type

Survival Function
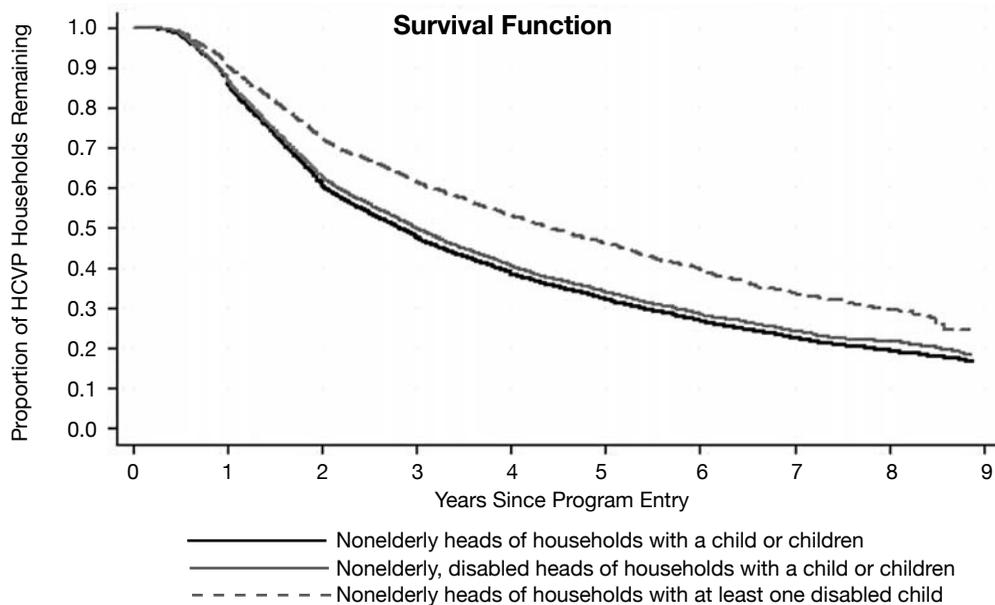
HCVP = Housing Choice Voucher Program.

About 90 percent of these households remain in the HCVP after 1 year since program entry, 71 percent remain after 2 years since program entry, and around 60 percent are receiving housing assistance after 3 years since program entry. Approximately one-quarter of the households remain in the HCVP after 9 years since program entry.

The survival curves suggest that many households exit after the first year of program participation, but the curves do not disaggregate the exit rates by entry cohort. For example, households that entered before 1998 (the year QHWRA was passed) may exit at different rates than households that entered more recently.

Exhibit 7 shows the cumulative exit rates by year of entry and years since entry for each head-of-household type, 1997–2004. Although very few households exit the program after 1 year of participation, a dramatic increase in exit rates is noticeable as participants stay in the HCVP for longer periods of time.

For example, among nonelderly heads of households with a child or children who entered in 1997, only 1 percent exited after 1 year of participation, but 43 percent exited by the second year of participation (a 42-percentage-point increase). The cumulative exit rate continues to increase with each additional year in the program, although the magnitude of the increases tapers gradually from 19 percentage points between years 2 and 3 to about 2 percentage points between years 7 and 8. By the eighth year of program participation, 84 percent of nonelderly heads of households with a child or children who entered in 1997 have exited from the program. Similar trends are

Exhibit 7

Cumulative Exit Rates in the HCVP by Year of Entry and Years Since Entry for Each Head-of-Household Type, 1997–2004

	Year of Entry							
	1997	1998	1999	2000	2001	2002	2003	2004
Nonelderly heads of households with a child or children								
Number of years since entry	(percent)							
1	1.0	1.1	2.5	2.1	2.8	1.4	1.4	1.4
2	43.0	41.7	37.4	29.6	36.6	24.3	25.0	
3	62.1	59.3	52.8	49.5	50.5	40.6		
4	72.2	68.0	65.7	60.0	60.6			
5	78.2	75.7	72.5	67.9				
6	83.4	80.2	77.7					
7	86.4	83.7						
8	88.8							
Total households	(number)							
	75,415	72,460	70,495	70,516	105,921	92,271	87,389	63,305
Nonelderly, disabled heads of households with a child or children								
Number of years since entry	(percent)							
1	0.4	0.5	1.6	1.3	1.5	1.0	1.1	1.2
2	33.1	36.2	32.7	26.9	33.2	25.8	27.0	
3	51.2	52.8	48.1	46.0	47.5	43.5		
4	62.7	62.4	61.2	57.6	59.0			
5	69.3	71.4	69.2	66.7				
6	76.0	76.6	75.2					
7	80.2	81.2						
8	83.8							
Total households	(number)							
	11,966	11,353	12,034	11,119	15,395	13,292	12,237	8,510
Nonelderly heads of households with at least one disabled child								
Number of years since entry	(percent)							
1	0.4	0.8	1.8	1.1	1.6	0.9	0.9	1.1
2	30.8	26.8	25.6	19.3	22.5	16.6	19.3	
3	46.4	40.7	37.7	33.5	33.6	30.2		
4	56.9	49.6	48.3	44.0	43.3			
5	64.1	57.8	55.8	53.2				
6	70.5	64.0	63.6					
7	74.7	68.9						
8	78.6							
Total households	(number)							
	2,933	2,772	2,831	2,976	4,504	3,717	3,470	2,676

HCVP = Housing Choice Voucher Program.

observed for other head-of-household types and entry cohorts, although nonelderly heads of households with a child or children have the highest exit rates for each year of participation and nonelderly heads of households with at least one disabled child have the lowest exit rates for each year of participation; nonetheless, these findings are consistent with Freeman's (2005) conclusions that the likelihood of exiting housing assistance is highest in the earliest years of an assisted housing stay. These findings also suggest that most households with a child or children, including households with a nonelderly, disabled head of household or at least one disabled child, are not long-term users of the HCVP.

Exit rates diminish steadily across entry cohorts, except for a slight increase in exit rates among households that entered in 2001. For example, although 31 percent of nonelderly heads of households with at least one disabled child that entered in 1997 exited after 2 years of program participation, only 19 percent of households that entered in 2003 exited after 2 years in the program. Similarly, 57 percent of nonelderly heads of households with at least one disabled child that entered in 1997 exited after 4 years of program participation, but only 43 percent of households that entered in 2001 exited after 4 years in the program. These trends are observed for all head-of-household types. Thus, cohorts that entered recently are less likely to exit the program when compared with older entry cohorts. This finding may be associated with tighter housing markets over time and fewer affordable housing options. It may also suggest that the characteristics of more recent cohorts are different from those of older cohorts, and these differences are related to longer lengths of stay in the HCVP.

Exhibit 8 focuses on the composition of households entering the HCVP with children of different ages by entering cohort, and evidence suggests that more recent cohorts are different from past cohorts. The proportion of households with infants has steadily increased across entry cohorts, from about 46 percent in 1997 to 54 percent in 2004 (or an 8-percentage-point increase). The

Exhibit 8

Percentage of Households Entering the HCVP With Children of Different Ages, by Entering Cohort

Household Type[a]	Entering Cohort							
	1997	1998	1999	2000	2001	2002	2003	2004
	(percent)							
Households with infants ages 0–3	45.9	47.1	49.2	51.6	51.3	52.1	51.8	53.5
Households with toddlers ages 4–5	28.1	28.9	27.6	26.0	26.5	25.3	26.2	26.8
Households with young children ages 6–12	55.2	53.4	52.7	51.3	50.3	49.4	49.4	48.0
Households with teenagers ages 13–17	27.3	27.3	24.9	23.7	24.9	25.0	26.6	24.9
	(number)							
Total households	90,314	86,585	85,360	84,611	125,820	109,280	103,096	74,491

HCVP = Housing Choice Voucher Program.

[a] Household types are not mutually exclusive—households may be observed in more than one household type—and thus the column percentages may not total 100 percent.

increase in the proportion of households with infants has occurred simultaneously with a decrease in households with children of other ages, especially households with young children ages 6–12. From 1997 to 2004, the proportion of households with children in this age group decreased by about 7 percentage points.

Changes in the proportion of households with children of different age groups entering the HCVP could influence exit rates from the program if the presence of children of different ages is associated with program exits. The results from the multivariate analysis address this relationship.

Results From the Multivariate Analysis

Exhibits 9 and 10 show the results from the piecewise-exponential duration models.[9] Exhibit 9 provides the estimates from the first model, which includes dummy variables for the presence of children in different age groups and genders, and an array of household and location characteristics. Exhibit 10 summarizes the results from the full model, which include the various household and location characteristics, the child-dummy variables from the first model, and the series of child-interaction terms. All the estimates from the full model appear in exhibit B-1 in appendix B.

The results reported in exhibit 9 are consistent with previous research on the effect of household and location characteristics on attrition rates. Among all household types, several of the following household and location characteristics are associated with lengths of stay in the HCVP:

- **Race.** African-American households have lengths of stay in the HCVP that are 51 percent longer than those of White households (the omitted reference category), and Hispanics have lengths of stay that are 28 percent longer than those of Whites. The longer lengths of stay associated with minorities are observed across all household types, although the effect on nonelderly, disabled heads of households with a child or children is less severe. Nonelderly, disabled heads of households who are African American and have a child or children stay about 27 percent longer than White, nonelderly disabled heads of households with a child or children.

- **Gender.** Households headed by females have lengths of stay that are 18 percent longer than households headed by males. The effect of gender on length of stay is consistent across all household types.

- **Homeless Status.** The expected length of stay among people who were previously homeless is about 3 percent shorter than the length of stay among people who were previously not homeless.

- **Income.** Among all household types, a $1,000 increase in annual income is associated with a 1-percent decrease in a household's length of stay in the program. The effect of income on length of stay is more pronounced among nonelderly heads of households with at least one disabled child. For these households, a $1,000 increase in annual income is associated with a 3-percent decrease in length of stay. Wage income had a marginal effect on length of stay.

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[9] Because all household records were used in the analysis, even small differences in the estimates will be statistically significant; thus, it is important to focus on the size of the estimates.

Exhibit 9

Estimates From the Piecewise-Exponential Duration Model With Child-Dummy Variables

Variable	Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child	
		Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio
Panel A: Household Characteristics									
AgeHH	Age of household head	– 0.0048	0.9952 ***	– 0.0015	0.9985 **	– 0.0107	0.9893 ***	– 0.0009	0.9991
FamSize	Total number of people in the household	– 0.0742	0.9284 ***	– 0.0784	0.9246 ***	– 0.0597	0.9420 ***	– 0.1215	0.8856 **
Adult1824	Presence in household of adults ages 18–24	– 0.0459	0.9551 *	– 0.0368	0.9639 ***	– 0.0564	0.9452 *	0.0952	1.0999
Adult2534	Presence in household of adults ages 25–34	– 0.0103	0.9897	– 0.0151	0.9850	– 0.0387	0.9620	0.1112	1.1176
Adult35p	Presence in household of adults ages 35 and older	0.0562	1.0578 ***	0.0264	1.0268	0.0706	1.0731 **	0.0499	1.0511
Black	Head of household is non-Hispanic African American	0.4139	1.5126 ***	0.4391	1.5514 ***	0.2391	1.2700 ***	0.4398	1.5524 ***
Hispanic	Head of household is Hispanic	0.2530	1.2879 ***	0.2583	1.2947 ***	0.2522	1.2869 ***	0.2936	1.3412 ***
Other	Head of household is other race	0.1761	1.1925 ***	0.1572	1.1703 ***	0.2818	1.3255 ***	0.1944	1.2145
Female	Head of household is female	0.1661	1.1807 ***	0.1704	1.1858 ***	0.1585	1.1717 ***	0.1862	1.2047 ***
Homeless	Head of household was previously homeless	– 0.0311	0.9694 *	– 0.0320	0.9685 *	– 0.1250	0.8825 ***	0.2140	1.2386 *
Income[a]	Total household annual income	– 0.0093	0.9908 ***	– 0.0051	0.9949 ***	– 0.0155	0.9846 ***	– 0.0298	0.9707 ***
Wage[a]	Total household wage income	0.0060	1.0061 ***	0.0023	1.0023 ***	0.0164	1.0166 ***	0.0320	1.0325 ***
H2	Nonelderly, disabled head of household with a child or children	0.1741	1.1902 ***						
H3	Nonelderly head of household with at least one disabled child	0.2403	1.2716 ***						

Exhibit 9

Estimates From the Piecewise-Exponential Duration Model With Child-Dummy Variables (continued)

Variable	Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child	
		Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio
Panel B: Child-Related Characteristics									
nKids	Number of children in household	0.0912	1.0954 ***	0.0979	1.1028 ***	0.0280	1.0284	0.1128	1.1195 *
Kids03	Presence in household of infants ages 0–3	0.0942	1.0988 ***	0.0941	1.0986 ***	0.1498	1.1616 ***	0.1770	1.1937 ***
Kids45	Presence in household of toddlers ages 4–5	0.0855	1.0893 ***	0.0744	1.0772 ***	0.2003	1.2217 ***	0.1247	1.1328 **
Kids612m	Presence in household of male young children ages 6–12	0.1030	1.1085 ***	0.0860	1.0898 ***	0.2395	1.2706 ***	0.1073	1.1133 **
Kids612f	Presence in household of female young children ages 6–12	0.1117	1.1182 ***	0.0932	1.0977 ***	0.2555	1.2911 ***	0.1106	1.1170 **
Kids1317m	Presence in household of male teenagers ages 13–17	– 0.0353	0.9654 ***	– 0.0389	0.9618 ***	0.0261	1.0264	– 0.0500	0.9512 **
Kids1317f	Presence in household of female teenagers ages 13–17	– 0.0307	0.9698 ***	– 0.0381	0.9626 ***	0.0365	1.0371	– 0.0366	0.9641

Exhibit 9

Estimates From the Piecewise-Exponential Duration Model With Child-Dummy Variables (continued)

Variable	Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child	
		Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio
Panel C: Location Characteristics									
Lihtc[b]	Number of LIHTC units in census tract	0.0051	1.0051 *	0.0065	1.0066 **	– 0.0089	0.9912	0.0288	1.0293 *
Unemp	Metropolitan area unemployment rate, 2000	– 2.2991	0.1003 ***	– 2.6280	0.0722 ***	– 0.3878	0.6785	1.8120	6.1225
Vacancy	Metropolitan area rental vacancy rate, 2000	– 0.6362	0.5293 ***	– 0.6322	0.5314 ***	– 0.5756	0.5624 ***	– 0.6707	0.5113 ***
City	Household located in central city	0.0688	1.0712 ***	0.0736	1.0764 ***	0.0270	1.0274	0.0732	1.0760 *
Rural	Household located in rural or nonmetropolitan area	– 0.2592	0.7717 ***	– 0.2657	0.7666 ***	– 0.2002	0.8185 ***	– 0.2973	0.7428 ***
NEglnd	In the New England census division	0.1566	1.1695 ***	0.1589	1.1722 ***	0.1809	1.1982 ***	0.0484	1.0495
MAtlntc	In the Middle Atlantic census division	0.1323	1.1414 ***	0.1417	1.1522 ***	0.0952	1.0999 ***	0.0016	1.0016
ENCetrl	In the East North Central census division	– 0.1159	0.8905 ***	– 0.1164	0.8902 ***	– 0.0672	0.9350 **	– 0.1541	0.8572 **
WNCetrl	In the West North Central census division	– 0.2872	0.7503 ***	– 0.2943	0.7451 ***	– 0.1684	0.8450 ***	– 0.3837	0.6814 ***
SAtlntc	In the South Atlantic census division	– 0.1514	0.8595 ***	– 0.1518	0.8592 ***	– 0.1168	0.8898 ***	– 0.1626	0.8500 *
ESCetrl	In the East South Central census division	– 0.2073	0.8127 ***	– 0.2036	0.8158 ***	– 0.1629	0.8497 ***	– 0.4109	0.6630 ***
WSCetrl	In the West South Central census division	– 0.3030	0.7386 ***	– 0.3070	0.7356 ***	– 0.2010	0.8179 ***	– 0.3389	0.7126 ***
Mtn	In the Mountain census division	– 0.1588	0.8531 ***	– 0.1631	0.8495 ***	– 0.0604	0.9414	– 0.3857	0.6800 ***
Number of households		759,557		637,772		95,906		25,879	

Coeff. = coefficient. LIHTC = low–income housing tax credit.

a For the piecewise-exponential duration model, the income and wage variables were adjusted (divided) by a factor of 1,000.

b For the piecewise-exponential duration model, the LIHTC variable was adjusted (divided) by a factor of 100.

*Notes: *** significance at the 1-percent level; ** significance at the 5-percent level; * significance at the 10-percent level.*

- **Household Type.** Nonelderly, disabled heads of households with a child or children and nonelderly heads of households with at least one disabled child stay 19 and 27 percent longer, respectively, than nonelderly heads of households with a child or children stay.

- **Central-City Location.** Households in central cities stay 7 percent longer than households in suburban jurisdictions (the omitted reference category). The effect of urban location on length of stay is consistent across all household types, although the longer length of stay in the HCVP for households in central cities is less pronounced among nonelderly, disabled heads of households with a child or children.

- **Census Division.** Households in the New England and Middle Atlantic census divisions stay 16 and 14 percent longer, respectively, compared with households in the Pacific division (the omitted reference category). The effect of census division on length of stay is consistent across all household types.

The presence of children is associated strongly with lengths of stay in the HCVP, after controlling for an array of household and location characteristics, as shown in exhibit 9.

- **Number of Children.** Among all households, each additional child in a household is associated with a 10-percent increase in the household's expected length of stay. This effect is observed across all head-of-household types, although it is less pronounced among nonelderly, disabled heads of households with a child or children.

- **Infants (ages 0–3).** The presence of infants in a household increases lengths of stay among all households by about 10 percent when compared with households without the presence of infants. The effect of the presence of infants on lengths of stay is greater among nonelderly, disabled heads of households with a child or children (16 percent longer) and nonelderly heads of households with at least one disabled child (19 percent longer).

- **Toddlers (ages 4–5).** Among all households, the presence of toddlers increases lengths of stay by about 9 percent when compared with households without toddlers. The effect of toddlers on lengths of stay is especially pronounced among nonelderly, disabled heads of households with a child or children (22 percent longer).

- **Young Children (ages 6–12).** The presence of young children, regardless of gender, has large effects on lengths of stay in the program. Households with young female children stay about 12 percent longer than households without these children, and households with young male children show a similar effect on lengths of stay (about 11 percent longer). The effect of young children (male and female) on lengths of stay is especially acute for nonelderly, disabled heads of households with a child or children; those households have expected lengths of stay that are 27 and 29 percent longer than those of similar households without these children.

- **Teenagers (ages 13–17).** The presence of male or female teenagers in a household lowers expected lengths of stay by about 3 percent for most head-of-household types. The effect of teenagers on lengths of stay is again significantly different for nonelderly, disabled heads of households with a child or children; those households stay for about 3 percent longer than similar households without teenagers.

These results suggest that lengths of stay in the program are modestly longer when households include the presence of children under age 13 and are slightly shorter when they include teenagers. The results also indicate that these effects are more pronounced among nonelderly, disabled heads of households with a child or children. Depending on the severity of the disability, disabled heads of household may not have many opportunities for gainful employment, and many have fixed incomes from mainstream income supports, such as Supplemental Security Income. The presence of children in these head-of-household types may put further strain on household finances and, thus, limit the household's ability to pay rent in the private market, which can lead to longer lengths of stay in the HCVP.

Exhibit 10 summarizes key results indicating how relative survival times (or lengths of stay) for households with the presence of infants and toddlers change when households also include older children in varying ages and gender groups. The first column repeats the estimated overall effect of infants and toddlers from exhibit 9. The second column shows the *ratio of effects* of infants and toddlers when older children of various ages and genders also are present in the household. As noted earlier, we estimated the latter ratios by adding interactions between the infant and toddler dummy variables and the dummy variables for each of the other age-gender groups. (See exhibit B-1 for full results from this model.)

For example, row 1, column 2 shows that average lengths of stay are 10 percent longer overall in households with the presence of an infant compared with those without an infant. Column 4 shows that this effect is slightly lower (5 percent) in households that also have the presence of a male young child age 6–12 than in those that do not, and column 5 indicates that the difference is statistically significant. Findings in the first panel of exhibit 10 apply to all household types and suggest the following relationships:

- The presence of young children ages 6–12 in the same household with an infant or a toddler attenuates slightly the effect that infants and toddlers have on lengths of time in the program. The effects are somewhat larger for toddlers (about .90 to .91) than for infants (.95 to .97) and are about the same for male and female young children ages 6–12.

- The presence of teenagers, especially male teenagers, magnifies the lengthening of stays associated with infants and toddlers. For example, when a male teenager is present, the ratio of length of stay associated with an infant is 1.09 times larger than when no male teenager is present, and the ratio of length of stay for a toddler is 1.15 times larger.

- Effects are multiplicative; the presence of older boys and girls from multiple categories would have an even larger combined effect. For example, the increased length of stay associated with the presence of a toddler ages 4–5 is .90 * .90 = .81 times lower when households include both male and female young children ages 6–12.

The results for all households suggest that the presence of young children or teenagers in the same household with infants and toddlers affects the lengths of stay in the program. The descriptive statistics in exhibit 3 indicate that more households in the HCVP have an infant or a toddler and a young child than households with an infant or a toddler and a teenager. The lower prevalence of teenagers in households with infants or toddlers across all voucher households substantially constrains the negative effects of teenagers.

Exhibit 10

Summary of Child-Related Interaction Effects on Lengths of Stay in the HCVP

Overall Effect of Infant and Toddler[a]		Ratio of Effects of Infant and Toddler When Household Does and Does Not Include at Least One Older Child in Specified Age-Sex Groups		T-test
All households				
Infant ages 0–3	+ 10%***	Male young child ages 6–12	.95	***
		Female young child ages 6–12	.97	***
		Male teenager ages 13–17	1.09	***
		Female teenager ages 13–17	.98	
Toddler ages 4–5	+ 9%***	Male young child ages 6–12	.91	***
		Female young child ages 6–12	.90	***
		Male teenager ages 13–17	1.15	***
		Female teenager ages 13–17	1.06	**
Nonelderly heads of households with a child or children				
Infant ages 0–3	+ 10%***	Male young child ages 6–12	.97	***
		Female young child ages 6–12	.97	***
		Male teenager ages 13–17	1.06	***
		Female teenager ages 13–17	.98	***
Toddler ages 4–5	+ 8%***	Male young child ages 6–12	.93	***
		Female young child ages 6–12	.91	***
		Male teenager ages 13–17	1.14	***
		Female teenager ages 13–17	1.05	***
Nonelderly, disabled heads of households with a child or children				
Infant ages 0–3	+ 16%***	Male young child ages 6–12	.84	***
		Female young child ages 6–12	.93	*
		Male teenager ages 13–17	1.13	*
		Female teenager ages 13–17	1.01	
Toddler ages 4–5	+ 22%***	Male young child ages 6–12	.79	***
		Female young child ages 6–12	.84	***
		Male teenager ages 13–17	1.19	**
		Female teenager ages 13–17	1.10	
Nonelderly heads of households with at least one disabled child				
Infant ages 0–3	+ 19%***	Male young child ages 6–12	.90	*
		Female young child ages 6–12	.99	
		Male teenager ages 13–17	1.38	***
		Female teenager ages 13–17	.91	
Toddler ages 4–5	+ 13%***	Male young child ages 6–12	.80	***
		Female young child ages 6–12	.94	
		Male teenager ages 13–17	1.12	
		Female teenager ages 13–17	1.10	

HCVP = Housing Choice Voucher Program.

[a] The overall effect of an infant or a toddler is equal to the time ratios reported in exhibit 9.

Notes: *** significance at the 1-percent level; ** significance at the 5-percent level; * significance at the 10-percent level.

Findings in the remaining panels of exhibit 10, which apply to the three head-of-household types in the study, suggest the following conclusions:

- The effects of child-pairings on nonelderly, disabled heads of households with a child or children are consistently more pronounced in comparison with the other household types. For example, the effects associated with infants ages 0–3 and male young children ages 6–12 (.84) or with infants ages 0–3 and female young children ages 6–12 (.93) are larger than those associated with nonelderly heads of households with a child or children (.97 for both genders) and nonelderly heads of households with at least one disabled child (.90 and .99, respectively). Also, nonelderly, disabled heads of households with a child or children are the only households in the study to show negative effects from a female teenager with an infant (1.01).

- The effect of male teenagers on lengths of stay is most severe among infants in a household with a nonelderly head of household with at least one disabled child. When a male teenager is present in these head-of-household types, the ratio of lengths of stay associated with an infant is 1.38 times larger than when no male teenager is present.

- The multiplicative effect associated with households that include both male and female young children ages 6–12 is greatest in households with nonelderly, disabled heads of households with a child or children. For these head-of-household types, the increased length of stay associated with the presence of toddlers ages 4–5 is .79 * .84 = .66 times lower when households include both male and female young children ages 6–12.

These results raise interesting questions about the relationship between household composition and the ability of single heads of households to exit from the HCVP. Why do infants and toddlers lead to longer lengths of stay? Why do young children attenuate the effects associated with infants and toddlers on expected lengths of stay? And, finally, why do teenagers exacerbate the effects associated with infants and toddlers? In the absence of qualitative information about a household's decisionmaking process, answers to these questions are speculative.

As suggested earlier, the presence of infants and toddlers may lead some households to stay in the housing program until they can secure adequate daycare, which, in turn, provides an opportunity to find gainful employment. If those households are unable to find appropriate daycare for their infants or toddlers, then longer lengths of stay would be expected.

Reasons for the attenuating effects of young children (ages 6–12) on household lengths of stay are less clear. Responsible young children may be asked to babysit for the younger children in the household while the head of the household is taking incremental steps to become self-sufficient (for example, enrolling in a job-training program, going to a job interview, or completing a certificate or degree program), but the head of the household may be limited in his or her ability to pursue different types of self-sufficiency opportunities. For example, the head of a household may not feel comfortable leaving a young child with an infant or a toddler while the household head is working full time, but perhaps the household head does feel comfortable leaving the children while he or she attends a 2-hour General Educational Development (GED) class. The head of household potentially could become self-sufficient more quickly by attending GED classes during the day and working in the evening, but responsibilities for the children prevent the household

head from pursuing these activities simultaneously. Thus, young children in the household may facilitate the ability of a household head to become self-sufficient to the extent that the household head can relinquish his or her responsibilities for a short time, but not enough to overcome the exit-delays associated with having infants and toddlers in the household.

In addition, the results do not support the hypothesis that teenagers—male or female—help a household become self-sufficient by allowing the head of household to leave the infants or toddlers with the teenager and find gainful employment. On the contrary, the presence of teenagers, especially male teenagers, magnifies the stay-lengthening effect of the presence of infants and toddlers. Perhaps some households with at-risk teenagers are overwhelmed by the stresses brought on by the teenager, and, as a result, they decide to focus on stabilizing their household life before considering other important choices, such as seeking employment, asking for a raise, or uprooting the household and moving elsewhere. Or perhaps some households with teenagers prefer to keep their teenagers rooted in their social settings, and the housing assistance enables them to stay where they are. These hypotheses merit closer study and could be the subject of future research.

The results also suggest that PHAs that have large concentrations of households with a child or children, especially households with infants or toddlers only or households with infants, toddlers, and teenagers, should expect longer lengths of stay when compared with other household types. The longer lengths of stay in the program likely are affected by the location of PHAs because the results also suggest that location characteristics are associated with longer lengths of stay. Indeed, exhibit 11 shows the location and rent costs of PHAs in 2005 with the highest percentage of households with a child or children (under age 6)—weighted by the number of housing units—compared with other PHAs. PHAs with the highest percentage of households with young children are those whose proportion of households with young children is within the highest quartile among all PHAs. Also, households with infants and toddlers are defined as households with one or more children age 5 or younger.

We find a large concentration of PHA units with infants and toddlers (ages 5 or under) in central cities (56 percent), and about the same concentration for other areas (53 percent). Results shown in exhibit 9 suggest that households in central cities stay in the program about 7 percent longer than households in suburban jurisdictions, and, thus, the confluence of young children and central city locations is expected to lead to even longer lengths of stay. Few households participating in the HCVP (about 10 percent) are located in census divisions that were associated with longer lengths of stay; that is, the New England and Middle Atlantic divisions.

In addition, about one-quarter of PHA households participating in the HCVP reside in areas where the PHAs' average rent is more than the areas' FMRs. Past research suggests that higher cost areas are associated with longer lengths of stay (Susin, 1999), and increases in the monthly value of the local payment standard are also associated with lower rates of program exit (Olsen, Davis, and Carrillo, 2005). Although we were unable to control for local rent structures in the piecewise-exponential duration model because of multicollinearity issues, past research suggests that households in these higher cost markets are expected to stay in the program longer than households in lower cost markets.

Exhibit 11

Location and Rent Costs Among PHAs With the Highest Percentage of Households With Infants and Toddlers Compared With Other PHAs, 2005[a]

Characteristic	PHAs With Highest Percentage of Households With Young Children[b]	Other PHAs
Number of PHAs	604	1,816
Metropolitan location	(percent)	
Central city	56.2	53.4
Suburb	23.6	32.0
Nonmetropolitan area	20.2	14.7
Total	100.0	100.0
Census division		
New England	5.2	9.1
Middle Atlantic	4.5	18.8
East North Central	11.9	14.1
West North Central	8.8	6.5
South Atlantic	22.1	14.6
East South Central	10.8	4.4
West South Central	23.9	8.3
Mountain	5.5	5.1
Pacific	7.3	19.1
Total	100.0	100.0
Rent-to-FMR ratio[c]		
Average ratio	0.957	0.953
	(percent)	
> 1	25.5	23.0
1 to 0.85	68.2	69.2
0.85 to 0.75	6.1	7.3
< 0.75	0.2	0.5
Total	100.0	100.0

FMR = Fair Market Rent. PHA = public housing agency.

[a] The data in the table are weighted by number of housing units.

[b] PHAs with the highest percentage of households with young children are those whose proportion of households with young children is within the highest quartile among all PHAs. Households with infants and toddlers are defined as households with one or more children age 5 or younger.

[c] PHA data are aggregated to calculate mean gross rents each year, and mean rents among PHAs are compared with their respective metropolitan area's FMR to generate the rent-to-FMR ratio.

Conclusion

This study analyzed administrative data from HUD to explore the factors associated with a household's length of stay in the HCVP. Analyses summarize relationships between length of stay and various demographic, economic, and geographic characteristics of households. The study placed particular emphasis on differences in characteristics and program exit rates across three types of heads of households (nonelderly heads of households with a child or children; nonelderly,

disabled heads of households with a child or children; and nonelderly heads of households with at least one disabled child) and on the effect of the presence of children (and their number, ages, and spacing) on exit rates from the program.

Overall, we found that exit rates from the HCVP vary somewhat across head-of-household types. Households with a child or children have the highest rates of exit for each year of program participation, and nonelderly heads of households with at least one disabled child have the lowest rates of exit for each year of program participation. Exit rates by number of years of participation strongly suggest that most households with a child or children are not long-term participants in the HCVP. Half of all households exit the program after less than 3 years of program participation, and exit rates increase precipitously after 1 year of program participation. Depending on the head-of-household type and entry cohorts, as many as 43 percent of households exited the program by the second year of participation; however, exit rates diminish steadily across entry cohorts. Cohorts that entered recently are much less likely to exit the program after 1 or more years in the program when compared with cohorts who entered several years ago. This finding raises the possibility that characteristics related to a household's length of stay in the program may be somewhat different for cohorts who recently entered the program when compared with cohorts entering several years ago.

We also find that households with infants are increasingly common among new entrants in the HCVP. The proportion of households with infants has increased steadily across entry cohorts, which has occurred simultaneously with a decrease in households with children of other ages, particularly households with young children (ages 6–12). From 1997 to 2004, the proportion of households with young children at entry has decreased by about 7 percentage points. This finding is particularly important because the piecewise-exponential duration model suggests that the presence of children in a household strongly affects the household's expected length of stay in the HCVP.

The study's main findings on the effect of the presence of children in the household suggest that the presence of an infant or a toddler increases a household's length of stay in the HCVP, after data are controlled for an array of household and location characteristics. Moreover, the estimates associated with different-age child-pairings demonstrate that the presence of young children ages 6–12 in the same household that has infants and toddlers attenuates slightly the effect that infants and toddlers have on lengths of stay, and the effect is about the same for the presence of male and female young children ages 6–12. We also find that the presence of teenagers, especially male teenagers, magnifies the lengthening of stays associated with infants and toddlers, but the smaller proportion of households with teenagers and younger children in the study population constrains the negative effects of teenagers on lengths of stay. These findings are consistent across all household types, although the effects are particularly acute among nonelderly, disabled heads of households and nonelderly heads of households with at least one disabled child.

Overall, the study results have implications for policy decisions regarding the use of self-sufficiency programs, time limits on program participation, and tenant selection policies. The impetus for incorporating self-sufficiency programs into housing assistance programs is the belief that many participants are long-term program users who become dependent on government-subsidized housing. The study's results find little support for the notion that households, including households with a nonelderly, disabled head of household and households with at least one disabled child, stay

in the HCVP for long periods of time. On the contrary, about half of HCVP participants exited the program after 3 years of participation and about three-quarters exited after 6 years, although exit rates varied by entry cohort. These findings also suggest that time limits on program participation may be unnecessary.

The findings suggest that self-sufficiency programs that traditionally have focused on promoting positive outcomes among heads of households also should consider the needs of both infants or toddlers and teenagers. Access to adequate childcare among program participants may attenuate the effects that infants and toddlers have on lengths of stay if these services allow the head of household to seek employment, enroll in training or education, or otherwise become more self-sufficient. The need for adequate childcare has consistently been cited in research literature as a key barrier to households' self-sufficiency outcomes (Turnham et al., 2006). In addition, incorporating counseling services or after-school programs for at-risk teenagers may assuage the effects that teenagers (male or female) have on a household's length of stay in the program when younger children are present. These services may lessen the stress brought on by an at-risk teenager and help discipline the teenager, which, in turn, may allow the head of household to focus on other aspects of life, such as opportunities to become more self-sufficient.

The results also suggest that PHA policies may significantly affect lengths of stay among households with a child or children if the policies affect the characteristics of households entering the program. Evidence presented in this study suggests that recent entry cohorts are more likely to have infants or toddlers in the household and less likely to have older children, especially young children ages 6–12. This shift in household composition has occurred concomitantly with lower exit rates and longer expected lengths of stay among recent cohorts. This phenomenon raises several important questions about the forces that might be underpinning this shift. Are PHAs' tenant-selection preferences directly or indirectly promoting this shift? Is the management of waiting lists affecting the selection of applicants by age group of children in households and, thus, leading to longer lengths of stay in the program? Is the fungibility in income eligibility requirements between a PHA's public housing program and tenant-based HCVP resulting in a higher concentration of poor households (many with children) in the HCVP and, thus, leading to longer lengths of stay? Addressing these critical questions is fundamental to understanding how vouchers are used by program participants and how vouchers will turn over in the future.

Appendix A

Exhibit A-1

Descriptive Statistics for the Household Characteristic Variables, by Exit Status

Variable	Household Characteristics	Exiters		Stayers		Difference in Means Test
		Mean	Stdev	Mean	Stdev	
Panel A: Household Characteristics		(percent)				
AgeHH	Age of household head	31.23	9.29	30.81	8.59	***
FamSize	Total number of people in the household	3.19	1.22	3.28	1.26	***
Adult1824	Presence in household of adults ages 18–24	36	48	34	47	***
Adult2534	Presence in household of adults ages 25–34	41	49	44	50	***
Adult35p	Presence in household of adults ages 35 or older	34	48	32	46	***
White	Head of household is non-Hispanic White	47	50	28	45	***
Black	Head of household is non-Hispanic African American	37	48	53	50	***
Hispanic	Head of household is Hispanic	13	34	16	36	***
Other	Head of household is other race	3	18	3	17	***
Female	Head of household is female	88	33	93	26	***
nMarried	No spouse is present in household	88	32	92	27	***
Homeless	Head of household was previously homeless	3	17	4	20	***
		(US$)				
Income	Total household annual income	10,050	6,217	10,789	6,632	***
Asset	Total household asset amount	56	1,037	19	558	***
Wage	Total household wage income	5,573	7,229	6,121	7,816	***
		(percent)				
adjAMI	Household income in proportion to AMI	21	12	20	11	***
adjRent	Gross rent in proportion to FMR	102	173	100	17	***

Exhibit A-1

Descriptive Statistics for the Household Characteristic Variables, by Exit Status (continued)

Panel B: Child-Related Characteristics

| Variable | Household Characteristics | Exiters | | Stayers | | Difference in |
		Mean	Stdev	Mean	Stdev	Means Test
nKids	Number of children in household	1.94	1.09	2.10	1.17	***
			(percent)			
Kids03	Presence in household of infants ages 0–3	50	50	51	50	***
Kids45	Presence in household of toddlers ages 4–5	24	43	28	45	***
Kids612m	Presence in household of male young children ages 6–12	34	61	41	65	***
Kids612f	Presence in household of female young children ages 6–12	35	61	41	65	***
Kids1317m	Presence in household of male teenagers ages 13–17	18	44	16	43	***
Kids1317f	Presence in household of female teenagers ages 13–17	19	45	17	44	***
Kids03*Kids612m	Presence in household of infants ages 0–3 and male young children ages 6–12	9	28	11	31	***
Kids03*Kids612f	Presence in household of infants ages 0–3 and female young children ages 6–12	8	28	11	32	***
Kids03*Kids1317m	Presence in household of infants ages 0–3 and male teenagers ages 13–17	2	14	2	16	***
Kids03*Kids1317f	Presence in household of infants ages 0–3 and female teenagers ages 13–17	3	17	3	17	*
Kids45*Kids612m	Presence in household of toddlers ages 4–5 and male young children ages 6–12	7	25	8	28	***
Kids45*Kids612f	Presence in household of toddlers ages 4–5 and female young children ages 6–12	7	25	8	27	***
Kids45*Kids1317m	Presence in household of toddlers ages 4–5 and male teenagers ages 13–17	1	11	2	13	***
Kids45*Kids1317f	Presence in household of toddlers ages 4–5 and female teenagers ages 13–17	1	12	2	14	***

Exhibit A-1

Descriptive Statistics for the Household Characteristic Variables, by Exit Status (continued)

Variable	Household Characteristics	Exiters		Stayers		Difference in Means Test
		Mean	Stdev	Mean	Stdev	
Panel C: Location Characteristics						
Vacancy	Metropolitan area rental vacancy rate, 2000	9.2	6.4	8.6	6.2	***
		(percent)				
Lihtc	Number of LIHTC units in census tract	39.63	93.91	46.47	108.99	***
		(percent)				
Unemp	Metropolitan area unemployment rate, 2000	6	2	6	1	***
OwnOcc	Metropolitan area owner-occupancy rate, 2000	56.4	19.8	50.5	22.1	***
City	Household located in central city	43	49	56	50	***
Suburb	Household located in suburban area	29	45	31	46	***
Rural	Household located in rural or nonmetropolitan area	29	45	13	34	***
PovRate	Metropolitan area poverty rate	19.1	11.3	21.0	12.6	***
NEglnd	In the New England census division	5	21	6	23	***
MAtlntc	In the Middle Atlantic census division	10	29	16	37	***
ENCetrl	In the East North Central census division	14	35	15	36	***
WNCetrl	In the West North Central census division	11	32	6	24	***
SAtlntc	In the South Atlantic census division	16	36	17	38	***
ESCetrl	In the East South Central census division	8	28	7	25	***
WSCetrl	In the West South Central census division	16	37	13	33	***
Mtn	In the Mountain census division	6	25	5	22	***
Pac	In the Pacific census division	13	34	15	35	***
Number of households		372,182		387,375		

AMI = area median income. FMR = Fair Market Rent. LIHTC = low-income housing tax credit. Stdev = standard deviation.
Notes: *** significance at the 1-percent level; ** significance at the 5-percent level; * significance at the 10-percent level.

Appendix B

Exhibit B-1

Estimates From the Full Piecewise-Exponential Duration Model

Variable	Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child	
		Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio
Panel A: Household Characteristics									
AgeHH	Age of household head	– 0.0045	0.9955 ***	– 0.0012	0.9988	– 0.0104	0.9897 ***	– 0.0006	0.9994
FamSize	Number of people in the household	– 0.0725	0.9301 ***	– 0.0764	0.9264 ***	– 0.0597	0.9420 ***	– 0.1277	0.8801 **
Adult1824	Presence in household of adults ages 18–24	– 0.0497	0.9515 ***	– 0.0399	0.9609 ***	– 0.0646	0.9374 **	0.0958	1.1005
Adult2534	Presence in household of adults ages 25–34	– 0.0092	0.9909	– 0.0144	0.9857	– 0.0324	0.9681	0.1236	1.1316
Adult35p	Presence in household of adults ages 35 or older	0.0550	1.0566 ***	0.0253	1.0256	0.0708	1.0733 **	0.0594	1.0612
Black	Head of household is non-Hispanic African American	0.4145	1.5136 ***	0.4399	1.5525 ***	0.2386	1.2695 ***	0.4427	1.5569 ***
Hispanic	Head of household is Hispanic	0.2530	1.2879 ***	0.2584	1.2949 ***	0.2504	1.2845 ***	0.2956	1.3440 ***
Other	Head of household is other race	0.1750	1.1913 ***	0.1564	1.1693 ***	0.2755	1.3172 ***	0.2084	1.2316 *
Female	Head of household is female	0.1663	1.1809 ***	0.1708	1.1862 ***	0.1584	1.1716 ***	0.1791	1.1962 ***
Homeless	Head of household was previously homeless	– 0.0319	0.9686 *	– 0.0325	0.9681 *	– 0.1264	0.8813 ***	0.2095	1.2330 *
Income[a]	Total household annual income	– 0.0094	0.9907 ***	– 0.0052	0.9948 ***	– 0.0155	0.9846 ***	– 0.0297	0.9707 ***
Wage[a]	Total household wage income	61.0000	1.0061 ***	0.0023	1.0023 ***	0.0162	1.0164 ***	0.0318	1.0323 ***
H2	Nonelderly, disabled head of household with a child or children	0.1741	1.1902 ***						
H3	Nonelderly head of household with at least one disabled child	0.2403	1.2716 ***						

Exhibit B-1

Estimates From the Full Piecewise-Exponential Duration Model (continued)

Variable	Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child	
		Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio
Panel B: Child-Related Characteristics									
nKids	Number of children in household	0.0881	1.0921 ***	0.0947	1.0993 ***	0.0240	1.0243	0.1072	1.1132 *
Kids03	Presence in household of infants ages 0–3	0.1217	1.1294 ***	0.1190	1.1264 ***	0.2098	1.2334 ***	0.2219	1.2484 ***
Kids45	Presence in household of toddlers ages 4–5	0.1349	1.1445 ***	0.1153	1.1222 ***	0.2989	1.3484 ***	0.2367	1.2670 ***
Kids612m	Presence in household of male young children ages 6–12	0.1316	1.1406 ***	0.1087	1.1148 ***	0.2982	1.3474 ***	0.1696	1.1849 ***
Kids612f	Presence in household of female young children ages 6–12	0.1397	1.1500 ***	0.1199	1.1273 ***	0.2962	1.3447 ***	0.1321	1.1412 ***
Kids1317m	Presence in household of male teenagers ages 13–17	–0.0470	0.9541 ***	–0.0506	0.9506 ***	0.0318	1.0323	–0.0754	0.9273
Kids1317f	Presence in household of female teenagers ages 13–17	–0.0470	0.9541 ***	–0.0506	0.9506 ***	0.0318	1.0323	–0.0754	0.9273
Kids03*Kids612m	Presence in household of infants ages 0–3 and male young children ages 6–12	–0.0487	0.9525 ***	–0.0353	0.9653 ***	–0.1740	0.8403 ***	–0.1101	0.8957 *
Kids03*Kids612f	Presence in household of infants ages 0–3 and female young children ages 6–12	–0.0356	0.9650 ***	–0.0322	0.9683 **	–0.0769	0.9259 *	–0.0098	0.9903
Kids03*Kids1317m	Presence in household of infants ages 0–3 and male teenagers ages 13–17	0.0816	1.0851 ***	0.0576	1.0593 **	0.1195	1.1269 *	0.3251	1.3842 ***
Kids03*Kids1317f	Presence in household of infants ages 0–3 and female teenagers ages 13–17	–0.0189	0.9813	–0.0251	0.9752	0.0134	1.0135	–0.0896	0.9143

Exhibit B-1

Estimates From the Full Piecewise-Exponential Duration Model (continued)

Variable	Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child	
		Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio
Kids45*Kids612m	Presence in household of toddlers ages 4–5 and male young children ages 6–12	– 0.0990	0.9057 ***	– 0.0739	0.9288 ***	– 0.2414	0.7855 ***	– 0.2191	0.8033 ***
Kids45*Kids612f	Presence in household of toddlers ages 4–5 and female young children ages 6–12	– 0.1089	0.8968 ***	– 0.0992	0.9056 ***	– 0.1719	0.8420 ***	– 0.0657	0.9364
Kids45*Kids1317m	Presence in household of toddlers ages 4–5 and male teenagers ages 13–17	0.1383	1.1483 ***	0.1316	1.1407 ***	0.1723	1.1881 **	0.1095	1.1158
Kids45*Kids1317f	Presence in household of toddlers ages 4–5 and female teenagers ages 13–17	0.0592	1.0610 **	0.0486	1.0498 *	0.0974	1.1024	0.0953	1.1000
Panel C: Location Characteristics									
Lihtc[b]	Number of LIHTC units in census tract	0.0052	1.0052 *	0.0066	1.0066 **	– 0.0088	0.9913	0.0284	1.0288 *
Unemp	Metropolitan area unemployment rate, 2000	– 2.2969	0.1006 ***	– 2.6243	0.0725 ***	– 0.3901	0.6770	1.8326	6.2501
Vacancy	Metropolitan area rental vacancy rate, 2000	– 0.6326	0.5312 ***	– 0.6283	0.5335 ***	– 0.5831	0.5581 ***	– 0.6802	0.5065 ***
City	Household located in central city	0.0685	1.0709 ***	0.0734	1.0762 ***	0.0281	1.0285	0.0720	1.0747 *
Rural	Household located in rural or nonmetropolitan area	– 0.2592	0.7717 ***	– 0.2658	0.7666 ***	– 0.1983	0.8201 ***	– 0.2976	0.7426 ***
NEglnd	In the New England census division	0.1566	1.1695 ***	0.1590	1.1724 ***	0.1791	1.1961 ***	0.0610	1.0629
MAtlntc	In the Middle Atlantic census division	0.1322	1.1414 ***	0.1416	1.1521 ***	0.0975	1.1024 ***	0.0056	1.0056

Exhibit B-1

Estimates From the Full Piecewise-Exponential Duration Model (continued)

Variable	Characteristics	All Households		Nonelderly Heads of Households With a Child or Children		Nonelderly, Disabled Heads of Households With a Child or Children		Nonelderly Heads of Households With at Least One Disabled Child	
		Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio	Coeff.	Time Ratio
ENCetrl	In the East North Central census division	– 0.1156	0.8908 ***	– 0.1161	0.8904 ***	– 0.0668	0.9354 **	– 0.1446	0.8654 *
WNCetrl	In the West North Central census division	– 0.2872	0.7504 ***	– 0.2942	0.7451 ***	– 0.1673	0.8459 ***	– 0.3823	0.6823 ***
SAtlntc	In the South Atlantic census division	– 0.1519	0.8591 ***	– 0.1522	0.8588 ***	– 0.1179	0.8888 ***	– 0.1544	0.8570 **
ESCetrl	In the East South Central census division	– 0.2076	0.8126 ***	– 0.2037	0.8157 ***	– 0.1625	0.8501 ***	– 0.4075	0.6653 ***
WSCetrl	In the West South Central census division	– 0.3027	0.7388 ***	– 0.3068	0.7358 ***	– 0.2014	0.8176 ***	– 0.3314	0.7179 ***
Mtn	In the Mountain census division	– 0.1589	0.8531 ***	– 0.1633	0.8493 ***	– 0.0569	0.9447	– 0.3890	0.6777 ***
Number of Households		759,557		637,772		95,906		25,879	

Coeff. = coefficient. LIHTC = low-income housing tax credit.

[a] *For the piecewise-exponential duration model, the income and wage variables were adjusted (divided) by a factor of 1,000.*

[b] *For the piecewise-exponential duration model, the LIHTC variable was adjusted (divided) by a factor of 100.*

*Notes: *** significance at the 1-percent level; ** significance at the 5-percent level; * significance at the 10-percent level.*

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